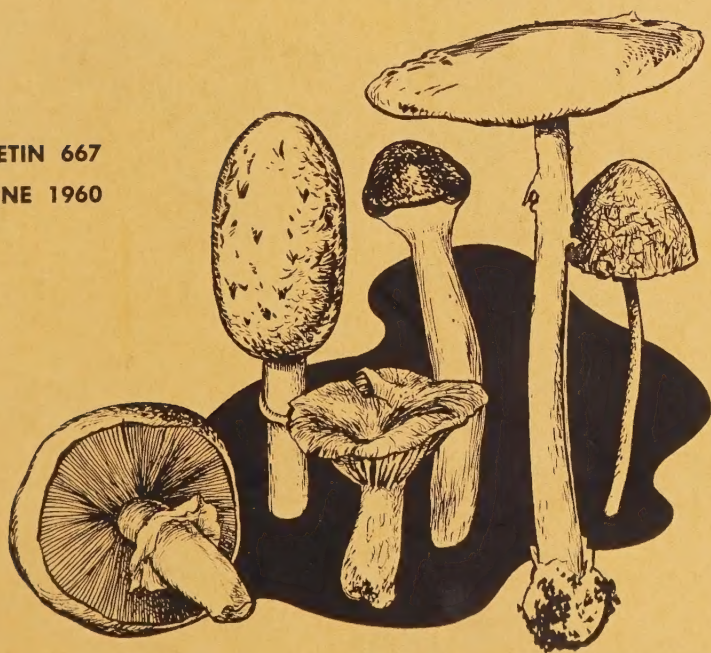


Some Common
Edible and Poisonous
MUSHROOMS
of Pennsylvania

BULLETIN 667

JUNE 1960



The Pennsylvania State University, College of Agriculture
Agricultural Experiment Station, University Park, Pennsylvania

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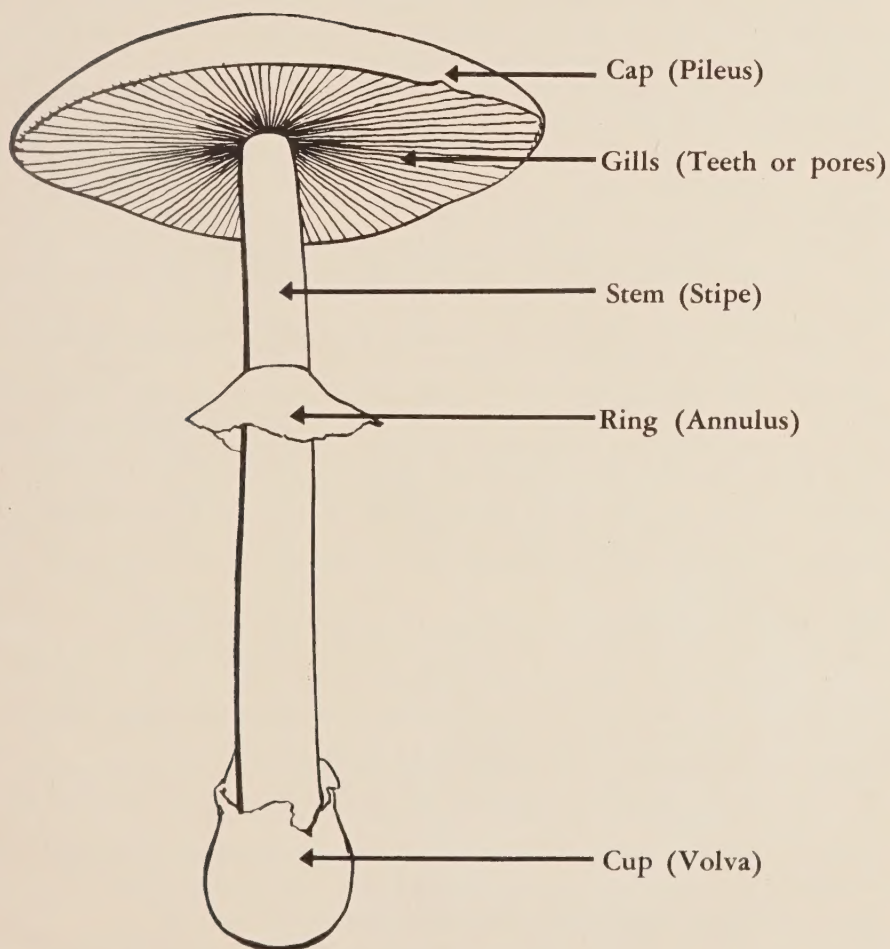
Mushrooms vary in size, shape and color with species:



And with age or stage of development:



Guide to Parts of Mushrooms



IMPORTANT PARTS OF MUSHROOMS

THIS BULLETIN is intended as a guide for persons untrained in mycology who wish to identify the common mushrooms which seem to appear from nowhere each year in Pennsylvania lawns, fields, and woods. In order to separate harmless and edible species from poisonous kinds, certain important parts of mushrooms must be recognized. These various parts, some with their scientific as well as common names, are presented with the sketch on the preceding page and in the following list:

- Annulus**—The remnants of the veil useful in the identification of certain mushrooms. See "Ring."
- Bulb**— Swelling at the base of the stem.
- Cap**— The expanded and often flattened part usually at the top of a stem of a mushroom. The underside of the cap bears the gills, teeth, or pores.
- Convex**— Rounded or regularly elevated toward the center (used to describe the cap of certain mushrooms).
- Cup**— The scales or sheath seen at the base of the stem in some mushrooms. The cup is the remnant of a structure which completely covers the developing mushroom at first, but is ultimately broken and left at the base, usually partly underground. See "Volva."
- Flesh**— Inner substance of the stem or of the cap, exclusive of the external layer and of gills, teeth, or pores.
- Gills**— Leaf-like plates on the undersurface of the cap. See also "Teeth" and "Tubes."
- Lateral**— Attached to one side of the cap (used in describing the stem).
- Pileus**— The cap portion of a mushroom, with or without a stem. It bears gills, teeth, pores, etc. on the lower side. See "Cap."
- Pores**— The openings at the ends of the tubes of polypores and boletes, seen on the undersurface of the cap.
- Ring**— The remnants of the partial veil on the stem of certain mushrooms. It usually encircles the stem and is therefore called a ring. See "Annulus."
- Scale**— More or less raised portion of the outer skin-like layer of the cap.
- Spores**— Tiny reproductive bodies of mushrooms.
- Stem**— Stalk supporting the cap of a mushroom.
- Stuffed**— Of stem, interior is filled with a material different from the outer part, usually softer.
- Teeth**— Thorn-like or spine-like structures on the undersurface of the cap or branches of the Hydnums.
- Tubes**— Tubular or pipe-like structures found in the caps of polypores and boletes. Seen only when the cap is cut through.
- Volva**— The volva is an important part in the identification of many mushrooms. See "Cup."

Index of Edible and Poisonous Mushrooms by Month of First Appearance of Fruiting Bodies in Centre County

The fruiting bodies of some fungi come up only during brief periods; others may be found over a wide range of months. Collection data compiled by L. O. Overholts, Station Mycologist (deceased), during a collecting period of 25 years in Centre County, has been given for each mushroom described herein. However, weather and geographical location within the State influence date of appearance considerably.

MARCH AND APRIL

Fungi with Gills

	PAGE
<i>Collybia velutipes</i> —the Velvet Stem Collybia (Edible)	16
<i>Coprinus micaceus</i> —the Glistening Coprinus (Edible)	12

MAY AND EARLY JUNE

Fungi with Gills

<i>Amanita muscaria</i> —the Fly Mushroom (Poisonous)	5
<i>Amantia</i> species: Warning!	5
<i>Collybia radicata</i> —the Rooting Collybia (Edible)	15
<i>Coprinus atramentarius</i> —the Inky Cap (Edible)	11
<i>Coprinus comatus</i> —the Shaggy Mane (Edible)	12
<i>Lentinus lepideus</i> —the Scaly Mushroom (Edible but tough)	16

Fungi without Gills

<i>Morchella</i> species—the Sponge Mushrooms or Morels (Edible)	25
<i>Helvella infula</i> —the False Morel (Poisonous)	26

JUNE

Fungi with Gills

<i>Hypholoma incertum</i> —the Uncertain Hypholoma (Edible)	8
<i>Panaeolus retirugis</i> —(Poisonous)	13
<i>Pleurotus ostreatus</i> —the Oyster Mushroom (Edible)	14

JULY AND AUGUST

Fungi with Gills

<i>Agaricus campestris</i> —the Meadow or Field Mushroom (Edible)	7
<i>Amanita bisporigera</i> —(Poisonous)	6
<i>Amanita cothurnata</i> —(Poisonous)	6
<i>Armillaria mellea</i> —the Honey Mushroom or Oak Fungus (Edible)	9
<i>Cantharellus cibarius</i> —the Chanterelle (Edible)	13
<i>Clitocybe illudens</i> —the False Chanterelle or Jack-O'-Lantern (Poisonous)	15
<i>Lepiota procera</i> —the Parasol Mushroom (Edible)	10
<i>Lepiota molybdites</i> —(Poisonous)	10

Fungi without Gills

PAGE

Fleshy Pore Fungi

<i>Boletus bicolor</i> —the Two-colored Boletus (Edible)	18
<i>Boletus edulis</i> —the Edible Boletus or Cepe (Edible)	18 & 19
<i>Boletus scaber</i> —the Rough-stemmed Boletus (Edible)	19
<i>Boletinus pictus</i> —the Painted Boletinus (Edible)	20
<i>Strobilomyces strobilaceus</i> —the Cone Boletus (Edible)	20
<i>Fistulina hepatica</i> —the Beefsteak Mushroom (Edible)	21
<i>Polyporus sulphureus</i> —the Sulphur Polypore (Edible)	22

Fleshy Coral Fungi

<i>Clavaria</i> —The Coral Fungi (Edible)	24
<i>Clavaria botrytis</i> —(Edible)	24

Fleshy Toothed Fungi

<i>Hydnum erinaceus</i> —the Hedgehog Mushroom (Edible)	23
---	----

Fleshy Club and Funnel Fungi

<i>Craterellus cantharellus</i> —the Chanterelle Craterellus (Edible)	25
<i>Craterellus cornucopoides</i> —the Horn of Plenty (Edible)	24

AUGUST AND SEPTEMBER

Fungi with Gills

<i>Amanita solitaria</i> —(Poisonous)	6
<i>Amanita verna</i> —the Destroying Angel (Poisonous)	6
<i>Lactarius deliciosus</i> —the Delicious Lactarius (Edible)	10 & 11
<i>Lactarius indigo</i> —the Blue Lactarius (Edible)	11
<i>Pleurotus ulmarius</i> —the Elm Pleurotus (Edible)	14

Fungi without Gills

Fleshy Pore Fungi

<i>Polyporus frondosus</i> —the Hen of the Woods (Edible)	21
---	----

Fleshy Toothed Fungi

<i>Hydnum coralloides</i> —the Coral Hydnum (Edible)	22
<i>Hydnum repandum</i> —the Spreading Hydnum (Edible)	23

Puffballs

<i>Calvatia gigantea</i> —the Giant Puffball (Edible)	27
<i>Calvatia craniformis</i> —the Skull-shaped Puffball (Edible)	26 & 27

OCTOBER AND NOVEMBER

Fungi with Gills

<i>Hypholoma sublateritium</i> —the Brick-red Hypholoma (Edible)	8 & 9
<i>Tricholoma personatum</i> —the Masked Tricholoma or Blewits (Edible)	17

Some Common Edible and Poisonous Mushrooms of Pennsylvania*

CHARLES L. FERGUS†

MANY SPECIES OF FUNGI, including mushrooms, grow wild in Pennsylvania. Interest in these organisms due to their sudden and bizarre appearance, rapid growth, striking colors, and possible use as food, has been shown by people of diverse ages and backgrounds. Mushrooms also are excellent objects for hobby and nature study and matchless photographic subjects.

As sources of food, wild mushrooms may be divided into those known to be dangerously poisonous, slightly poisonous, suspected, disagreeable in taste, edible but of mediocre taste, and those of excellent flavor. The possibility of individual variable allergic reactions to mushrooms, just as to eggs and strawberries, must also be considered.

In this publication an attempt is made to describe, by means of text and photographs,¹ some of the common edible fungi found in this State. Poisonous species are included so that collectors may know when and where to expect to find them and thus avoid them.

According to estimates, about 1500 kinds of fungi of mushroom type appear in this area. It is beyond the scope of this publication to consider them all. Obviously, the collector will encounter many fungi not included, since only 44 are described. However, the ones included are quite common and will be encountered more frequently than the ratio would indicate.

The mushrooms described herein have been selected for various reasons. First, each possesses characteristics so distinctive that the average person may quickly learn to know them. Second, of the edible mushrooms listed, only those are included that have no suspicious history. Third, they are quite common, having been collected many times, in many places, year after year.

No rules are known by which an inexperienced person can distinguish poisonous from edible fungi. To be safe, a collector must be able to recognize edible species just as he recognizes a violet or a rose. The edibility of many of our wild mushrooms still is not known. You can not tell by looking at any plant whether it is poisonous or not. Keep in mind that the only way to determine if a plant is poisonous is for someone to have been poisoned by it after eating it.

*Authorized for publication April 7, 1960. Contribution No. 251 from The Department of Botany and Plant Pathology.

†Professor of Botany and Plant Pathology.

¹The photographs used are from the files of Dr. L. O. Overholts.

ACKNOWLEDGMENT: Grateful acknowledgment is made to Dr. Alexander H. Smith, University of Michigan, for critically reviewing this manuscript.

The following important precautions should be rigidly observed:

(1) *Do not* eat any fungi that you can not definitely recognize and which have not been recorded as edible.

(2) *Do not* eat any wild mushrooms just because they are *not* recognizable as of a poisonous species.

(3) Never eat a fungus that is beginning to discolor or deteriorate, or that has been partially devoured or invaded by insects.

(4) Be sure to *dig up the entire mushroom* so that all underground parts will be collected. Never eat a fungus that has both a cup (volva) at the base of the stem and a ring (annulus) around the upper part of the stem. See "Guide to Parts of Mushrooms."

(5) Do not mix mushrooms as you collect them. Keep each collection separate and sort them carefully.

(6) Be extremely careful in identification of any fungi that have white spore prints, or are in the early stage of development (button stage). At this time, certain important identifying characters will not yet be developed. If in doubt about the identity of a specimen and the fungus is a gilled mushroom, a spore print should be made unless positive determination of the color of the expelled spores *en masse* is possible from the ground or debris at time of collection. Spores are very small and are visible to the naked eye only when massed in large numbers. To make a spore print, always select a mature specimen. Cut the stem off flush with the gills and lay the cap, gills down, partly on white paper and partly on black paper. Cover this arrangement so that air currents will not disturb it and the mushroom will not dry out too rapidly. A spore print should become evident in 1 to 2 hours. You can determine the spore color *en masse* as white, rosy or pink, yellow- to rusty-brown, dark- or purple-brown, or black. Spore prints are beautiful. They may be used for decoration if sprayed with a fixative, such as white shellac dissolved in alcohol.

(7) If necessary, or if it is discovered that a poisonous fungus has been eaten, induce vomiting immediately and call your doctor!

AIDS IN IDENTIFICATION

A key in plant science is simply a specialized short cut to positive identification. In the identification of mushrooms, one choice after another is eliminated until there is left but a single one to which the mushroom at hand can be assigned. The use of a key demands continual choosing; either the mushroom at hand does or does not have a certain characteristic. Great care is necessary in making the various choices in the use of a key.

Let us choose *Pleurotus ostreatus* (Figure 17) as an example and attempt to key it down. Start with choice 1 in the key. It is a mushroom with gills on the underside of the cap; hence move to choice 2. Does it have a ring on the stem or

not? See "Guide to Parts of Mushrooms" for an illustration of a ring. It does not; so, move to choice 5. The gills do not exude a milky juice when broken, so move to choice 8. The gills are sharp-edged or thin; so, move to choice 9. The stem is lateral; so, the mushroom is a *Pleurotus*. Turn to the page upon which *Pleurotus* is described and compare specimens with the text description and the photograph. If they agree, you know you have collected *Pleurotus ostreatus*. If the description of the species of *Pleurotus* does not coincide closely with your collection, or if you can not find a name in the key of a fungus that agrees with your collection, you probably have collected a fungus not included in this publication. You should discard such a collection unless you have available more complete and detailed mushroom books.

The mushrooms are described in the text in the same order as they are presented in the key.

Each description of a fungus includes color, size, presence or absence of annulus (ring) and of volva (cup), presence of gills (mushrooms) or of pores (polypores, boletes), locations where species commonly occur, substratum (soil, rotting wood, etc.) on which they grow, months of the year in which they usually appear, and other items of interest to collectors. Many fungi develop only in certain months, but others appear throughout the growing season. Each species in this booklet is listed by the seasonal range in which collections have been made in Centre County, Pennsylvania. Obviously, these dates must be adjusted, depending upon location of collection. Weather also may influence this. The substratum on which each species has been found also is listed but this does not mean that the fungus may not grow elsewhere occasionally. Poisonous species are included so that collectors may know when and where to expect to find them.

Fig. 1.—Development of a poisonous mushroom (*Amanita* sp.) to show progressive formation of the volva and ring.



KEY TO SOME PENNSYLVANIA MUSHROOMS

1. Mushrooms with gills on underside of cap 2
1. Mushrooms without gills 13
 2. Mushrooms with ring on the stem 3
 2. Mushrooms without ring 5
 3. Mushrooms with volva at base of the stem *Amanita*
 3. Mushrooms without volva 4
4. Purple-brown spore print *Agaricus & Hypholoma*
4. White spore print *Armillaria & Lepiota*
 5. Gills or cap exuding a milky juice if broken *Lactarius*
 5. Without milky juice 6
 6. Spore print white 8
 6. Spore print black 7
7. Gills & cap dissolve at maturity into a black ink *Coprinus*
7. Gills are dark-spotted and do not dissolve into ink *Panaeolus*
 8. Gills blunt and thick on edge and usually united into a network *Cantharellus*
 8. Gills sharp-edged 9
 9. Stem lateral *Pleurotus*
 9. Stem central 10
10. Gills running down the stem *Clitocybe*
10. Gills not running down the stem 11
 11. Edge of gills like saw-teeth *Lentinus*
 11. Edge of gill not saw-toothed 12
 12. Stem tough-brittle, breaking with a snap *Collybia*
 12. Stem fleshy-fibrous, not breaking with a snap *Tricholoma*
13. Mushrooms with many small pores on the underside of the cap 14
13. Mushrooms without pores 15
 14. Fleshy soft mushrooms, the tubes easily separable from other parts of the cap *Boletus*
 14. Tubes not easily separable *Boletinus & Polyporus*
Strobilomyces & Fistulina
 15. Fungi with teeth or spines on the pileus *Hydnum*
 15. Without teeth 16
16. Fungus looks like coral, consisting of many small, upright branches *Clavaria*
16. Fungus club-shaped, or funnel-shaped *Craterellus*
16. Fungus not coral-like, or club-shaped 17
 17. Fungus looks like a sponge or saddle *Morchella & Helvella*
 17. Fungus looks like a ball *Calvatia*

FLESHY-GILLED FUNGI

Amanita muscaria—the Fly Mushroom. (Poisonous.) Figure 2. June 12 to October 18. Cap 3 to 8 inches broad, slightly slimy when young, bright yellow, sometimes with an orange-red center. The volva is seen as prominent scales encircling the bulbous base of the stem. Occurs in groups, sometimes in rings in open woods (deciduous or conifers) and in bushy pastures. All species of *Amanita* should be avoided for many of the most deadly poisonous fungi are species of this genus. They may be distinguished from other fungi by the following characteristics: *white spores*, ring or annulus on the stem, and volva or cup at the base of the stem. The ring on the stem usually is easy to recognize; however, sometimes it

is lost in the expansion of the mushroom. Usually more than one specimen, each of different ages, are collected. The younger one should show the ring. The volva is more difficult to recognize. The volva may be distinctly cup-like and membranous, fig. 3. In this case it is easily recognized. Unfortunately, no distinct cup is formed in some species because the volva breaks up into scales, fig. 5, or crumbling particles. In some species the volva is united to the base of the stem giving it a bulbous appearance often detectable as concentric rings of tissue, figs. 2 and 5. The greatest danger is that the collector may not dig up the specimen properly, so that the volva, much of which is below the ground, is not seen. A specimen should never be collected by

Fig. 2.—*Amanita muscaria*—the Fly Mushroom (Poisonous).





Fig. 3.—*Amanita bisporigera* (Poisonous).

just snapping it off or breaking it—it should be carefully dug out to be sure to get all parts.

Amanita bisporigera—July to August (Poisonous.) Figure 3.

Amanita cothurnata—July to September (Poisonous.) Figure 4.

Amanita solitaria—September 1 to October 4. (Poisonous.) Figure 5.

Fig. 4.—*Amanita cothurnata* (Poisonous).



Amanita verna—the Destroying Angel. July 19 to October 13. (Poisonous.)

All of these are poisonous. See the figures to note the volva or cup at the base of each stem, and the annulus or ring on each stem. They all have white spore prints. Figure 1 illustrates the progressive development of *Amanita* sp. from "button" stage to the fully expanded mushroom stage.

Fig. 5.—*Amanita solitaria* (Poisonous).



Agaricus campestris—the Meadow or Field Mushroom. (Edible.) Figure 6. June 29 to October 2. Cap $1\frac{1}{2}$ to 4 inches broad, at first convex, then almost flat when expanded, smooth, white or cream-colored, flesh firm and white; stem 2 to 3 inches long, $\frac{1}{2}$ to $\frac{3}{4}$ inch thick, solid, white, smooth, with an annulus or ring at or near the middle but usually torn; gills pink or flesh-colored, protected by a delicate membrane (the annulus) when young, finally chocolate to blackish-brown when the annulus becomes the ring. Spore print dark to purple-brown. Occurs as scattered small groups, sometimes as fairy rings, on open grassy land such as lawns, golf courses,

park areas, etc. The pink to blackish-brown color of the gills and the distinct ring on the stem help to distinguish this fungus from other mushrooms. Several other closely related species of *Agaricus*, identifiable by similar gill color and ring, also are edible.



Fig. 6.—*Agaricus campestris* (above and below)—the Meadow or Field Mushroom (Edible).



Hypholoma incertum—the Uncertain Hypholoma. (Edible.) Figure 7. June 1 to August 6. Cap 1 to 2½ inches across, rather thin, bell-shaped when young, but umbrella-shaped later, and finally flat or level, appearing water-soaked, pale honey-yellow, then buff to white as the cap dries out, sometimes with a darker yellow center, slightly wrinkled, but smooth, sometimes with a delicate white fringe of loose fragments; stem 1½ to 3 inches long, ⅛ to ¼ inch thick, white, hollow, with a tendency to split lengthwise; veil (annulus) seen as soft, white fragments that cling to the edge of the cap or as a ring on the stem; gills at first white, then pale lilac, and finally purple-brown. Spore print dark to purple-brown. Usually occurs in large clusters in lawns, gardens, pastures, and occasionally associated with living deciduous trees.



Fig. 7.—*Hypholoma incertum*—the Uncertain Hypholoma (Edible).

Fig. 8.—*Hypholoma sublateritium* (*Naematoloma sublateritium*)—the Brick-red Hypholoma (Edible).



Hypholoma sublateritium (*Naematoloma sublateritium*)—the Brick-red Hypholoma. (Edible.) Figure 8. October 5 to November 21. Cap dark brick red, sometimes tawny, margin of lighter color, convex at first, later nearly flat, smooth, sometimes with fine silky fibers, fleshy, 1 to 4 inches across; gills crowded, whitish, becoming olive, finally deep purple-brown; stem solid, upper part light, base same color as cap, sometimes curved, 3 to 6 inches long and $\frac{1}{4}$ to $\frac{1}{2}$ inch thick. Spore print dark purple-brown (almost black). Occurs in dense clumps with numerous stems arising from the same place, on decaying stumps, tree roots, and on the ground near them.

Armillaria mellea—the Honey Mushroom, or Oak Fungus. (Edible.) Figure 9. June 16 to October 14, common after September, if abundant rains occur. Cap 1 to 6 inches across, rather thin, at first

hemispheric but finally flat, covered usually with numerous dark, hairy scales, especially in the center (however, scales are often lacking), pale yellow or reddish-brown, slightly slimy when young; stem 1 to 6 inches long and $\frac{1}{4}$ to $\frac{3}{4}$ inch thick, base slightly hairy, pallid or brownish, stuffed but hollow when old; gills white, running slightly down the stem, covered by a veil when young which ruptures to leave a ring high up on the stem. Spore print white. Usually occurs as clusters on the ground, probably coming from buried roots, on stumps, and on wood of a great variety of trees, especially oaks. Its yellow color, ring, scales, and habit of growth distinguish it from other fungi. *A. mellea* has an acrid taste which is lost when parboiled before final cooking. The poisonous fungus, *Clitocybe illudens*, which also grows from stumps of oaks, is orange in color but should be easily distinguished from this fungus.

Fig. 9.—*Armillaria mellea*—the Honey Mushroom or Oak Fungus (Edible).



Lepiota procera—the Parasol Mushroom. (Edible.) Figure 10. June 20 to October 12. Cap 3 to 6 inches across, ovate then expanded with a distinct smooth brown conical knob (umbo), covered with a red to brownish skin which breaks up into brown scales showing the white inner flesh; stem 5 to 12 inches long and $\frac{1}{2}$ inch thick, thinner upward from a bulbous base, generally scaly or spotted; cap free from stem, if removed a distinct socket remains in the cap; very large, thick ring or annulus present at maturity, may be moved up and down on the stem like a bracelet. The spore print is white. Occurs singly or in scattered groups in meadows, pastures, in open woods, and along roadsides. *Lepiota molybdites* is a poisonous species, but should not be mistaken for the Umbrella Mushroom because mature specimens of *L. molybdites* have green gills, and the stem is much thicker and more club-shaped.



Fig. 10.—*Lepiota procera*—the Parasol Mushroom (Edible).



Fig. 11.—*Lactarius deliciosus*—the Delicious Lactarius (Edible).

Lactarius deliciosus—the Delicious Lactarius. (Edible.) Figure 11. August 19 to October 7. Cap 2 to 5 inches across, at first convex but depressed in the center, later becomes shaped like a funnel, smooth, deep orange, fading to grayish-yellow when old, generally zoned, margin at first rolled in, then unfolding, flesh soft; cap, gills, and stem exude an *orange milk*, especially where wounded; stem 1 to 3 inches long and 1 inch thick, very squatty in appearance, stuffed or hollow. Spore print white. Occurs singly or in clusters of several individuals in mossy places and on the ground in the woods. This species is highly prized as food, and can be distinguished easily even by the beginner because of its orange color, concentric rings of light and dark orange on the cap, squat fat appearance, and orange milk. The cap turns green if bruised and as it ages.

Lactarius indigo—the Blue Lactarius. (Edible.) July 20 to September 4. Cap 2

to 5 inches across, at first centrally depressed, later almost funnel-shaped, indigo-blue or paler, fading when dry, with a silver-gray lustre, smooth but with zones; stem 1 to 2 inches long and $\frac{1}{4}$ to 1 inch thick, smooth, stuffed, or hollow, same color as cap; milk from cap, gills, and stem is abundant and dark-blue. Spore print white. Occurs as clusters on the ground in oak, maple, and pine woods. This species is unique in its striking blue color of cap and milk, and its stout appearance.

Coprinus atramentarius—Inky Cap. (Edible.) Figure 12. May 13 to October 28. Cap 1 to 3 inches across with a grayish bloom that readily comes off exposing the brown surface underneath; stem 2 to 4 inches long, hollow, smooth in the upper part, but with scales below; at maturity the gills dissolve into a black fluid. Spore print black. Occurs in groups, usually in rich soils such as gardens, or in woods.



Fig. 12.—*Coprinus atramentarius*—the Inky Cap (Edible).



Fig. 13.—*Coprinus comatus*—the Shaggy Mane (Edible).



tening with shiny particles, tawny-yellow. Stem hollow, 1 to 3 inches long, slender, fragile. Occurs in dense clumps around bases of living trees or stumps, on lawns, along sidewalks, and streets. Edible before the gills blacken. Matures rapidly.

Coprinus comatus—the Shaggy-mane. (Edible.) Figure 13. April 27 to November 18. Easily distinguished from other fungi because the cap does not open wide to a horizontal position. Cap 2 to 3 inches long, but expands to about 5 inches in length, egg-shaped to bell-shaped, whitish sometimes with pinkish shades, with yellow scales, with age dissolves into inky fluid; stem 3 to 7 inches long, white, pointed at the base, hollow and smooth to silky; movable ring on stem. Spore print black. Grows singly or in clusters, rarely in fairy rings, in rich earth along roadsides, pastures, lawns, gardens, and waste dumping grounds. A very fine tasting mushroom.



Fig. 14.—*Coprinus micaceus*—the Glistening Coprinus (Edible).

Coprinus micaceus—the Glistening Coprinus. (Edible.) Figure 14. March 18 to October 14. Readily distinguished by its *black spores* and by gills which with age dissolve into an inky fluid. Cap 1 to 2 inches across, furrowed, sometimes glis-

Panaeolus retirugis — (Poisonous.)

June 6 to July 17. Figure 15. Cap $\frac{1}{2}$ to $1\frac{1}{2}$ inches across; cone-shaped when young, later convex; dark-gray, tan, or pale yellow-gray; smooth at the center but with other parts becoming cracked or ridged. Stem 2 to 5 inches long, pale gray, darker at the base, hollow, fragile; gills at first white, then mottled dark gray or black. Spore print black. Usually occurs singly or in small groups, on manure heaps and in lawns and fields.



Fig. 15.—*Panaeolus retirugis* — (Poisonous).

Cantharellus cibarius—the Chanterelle. (Edible.) July 1 to August 25. Figure 16. Cap 1 to 4 inches across, fleshy, firm, convex then expanded, sometimes funnel-shaped, bright yellow, margin often wavy or irregular, curved, or upraised, flesh white; stem yellow, $1\frac{1}{2}$ to 3 inches long, thick, firm, solid, smooth, usually tapering downward; gills thick-edged, forked or united in a network, also running down the stem, pale yellow. Spore print yellowish. Usually occurs singly and in groups on the ground in deciduous

and conifer woods. There are other species of *Cantharellus* and all are edible: *C. aurantiacus*, the orange Chanterelle, *C. cinnabarinus*, the cinnabar-red or Vermilion Chanterelle, *C. floccosus*, the shaggy Chanterelle, and *C. infundibuliformis*, the funnel-shaped Chanterelle. All are characterized by the thick-edged gills which often are united in a network, or forked.



Fig. 16.—*Cantharellus cibarius*—the Chanterelle (Edible).

Pleurotus ostreatus—the Oyster Mushroom. (Edible.) Figure 17. May 28 to October 14. Cap 2 to 5 inches across, convex, soft, whitish, grayish, or brownish; flesh white, usually several caps one above another; stem may or may not be present, if so, it is short, 1 to 2 inches long, and lateral, sometimes hairy at the base; gills broad and running down onto the stem and branching or fusing, white. Spore print white or pale lilac. Occurs on decaying wood, stumps, dead or dying standing deciduous trees, such as elm, oak, beech, birch, maple, etc. The lateral stem and growth from trees helps to distinguish this fungus.

Pleurotus sapidus—(Edible) is similar to *P. ostreatus* except that it produces a grayish-lilac spore print.

Pleurotus ulmarius—the Elm Pleurotus. (Edible.) Figure 18. September 5 to October 5. Cap convex or nearly flat, white, sometimes tinged brownish or yellowish in the center, 3 to 6 inches across; flesh white, firm; stem attached to the side



Fig. 17.—*Pleurotus ostreatus*—the Oyster Mushroom (Edible).

of the cap, not central, white, smooth or rarely hairy at the base, 2 to 4 inches long, $\frac{1}{2}$ to $\frac{3}{4}$ inch thick. Spore print white or pale lilac. Occurs in clusters or singly from wounds, or stumps of cut branches of elm, maple, and poplar trees. Highly sought as food.



Fig. 18.—*Pleurotus ulmarius*—the Elm Pleurotus (Edible).

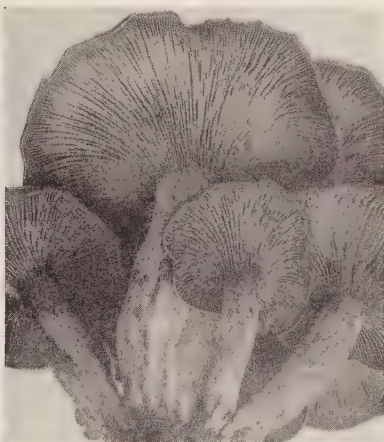


Fig. 19.—*Clitocybe illudens*—the False Chanterelle (Poisonous).

Clitocybe illudens—the False Chanterelle, or Jack-O'-Lantern. (Poisonous.) Figure 19. June 28 to October 3. Cap bright yellow or orange-yellow, 2 to 6 inches across, convex or flat, sometimes shallow funnel-shaped, often with a small conical knob (umbo) in the center, odor

strong; stem 2 to 7 inches long and $\frac{1}{4}$ to $\frac{3}{4}$ inches thick, uniformly thick except near the base where it may taper to a point, pale yellow, solid, very fibrous and usually curved; gills run down the stem. Spore print whitish to pale yellowish. Usually occurs as dense clumps in woods and open places, especially on stumps of oaks. The stems of 5 to 20 mushrooms may be fused into a common base. Can be distinguished from all others on the basis of its color, which is that of a ripe pumpkin, and its habitat.



Fig. 20.—*Collybia radicata*—the Rooting Collybia (Edible).

Collybia radicata—the Rooting Collybia. (Edible.) Figure 20. May 7 to September 12. Cap 1 to 4 inches across, grayish-brown to smoky-brown; flesh white, generally wrinkled or roughened radiately; stem 2 to 8 inches long above ground, ending below in a long root-like extension which penetrates 8 or 10 inches into the ground, usually obliquely. White spore print. Occurs as a few scattered specimens or in larger groups in open woods.

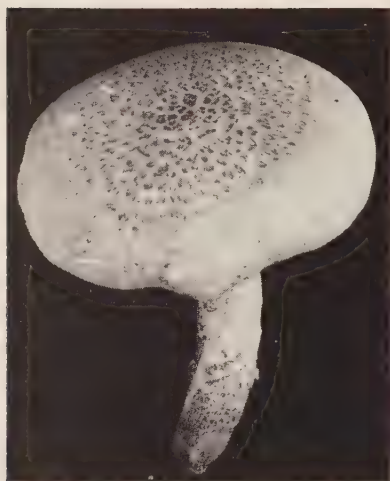


Fig. 21.—*Lentinus lepideus*—the Scaly Mushroom (Edible but tough).

Lentinus lepideus—the Scaly Mushroom. (Edible, but tough.) Figure 21. May 7 to August 8. Cap 2 to 4 inches across, white or pale brown with brownish spot-like scales; stem 1 to 3 inches long, white, solid, sometimes with scales. Gill edges like saw-teeth. Smells like licorice. Spore print pale yellowish. Usually occurs singly or in groups of 2 to 4, on wood of conifer trees, logs, posts,

stumps, and even railroad ties. Its odor and saw-tooth gill edges distinguish this mushroom from others. Except when very young it is so tough that it is best used in making soup or as an addition to gravies.

Collybia velutipes—the Velvet Stem Collybia. (Edible.) Figure 22. April 8 to November 17. Cap reddish-yellow or



Fig. 22.—*Collybia velutipes*—the Velvet Stem Collybia (Edible).

tawny, very slimy, 1 to 3 inches across, convex but soon flat, smooth; stem 1 to 4 inches long and less than $\frac{1}{4}$ inch thick, stuffed or hollow, brown or tawny-brown, sometimes almost black, densely velvety-hairy when mature. Spore print white. Usually occurs in dense clusters, on dead standing trees or on old stumps and decaying wood. This mushroom is easily distinguished by its dark hairy stem and slimy cap, which in cold weather becomes a thick glutinous coat. The caps should be peeled before cooking to rid them of clinging dirt, leaves, etc.

Tricholoma personatum—the Masked Tricholoma or Blewits. (Edible.) Figure

23. September 22 to November 7. Cap 2 to 6 inches across, convex, expanded, slightly depressed or flat, thick, smooth, pale watery-gray when young, pale lavender or purple when mature; margin at first downy or fuzzy and turned inward; flesh lavender or whitish, appearing water-soaked in wet weather; stem 1 to 3 inches long and $\frac{1}{2}$ to 1 inch thick, solid, white or colored like the cap, swollen into a bulb at the base. Spore print pale pink. Occurs in groups or clusters of many individuals on the ground, in woods and open places. One of the most acceptable edible species. Should be easily recognized because of its color, spore print, and month of occurrence.



Fig. 23.—*Tricholoma personatum*—the Masked Tricholoma or Blewits (Edible).

FLESHY PORE FUNGI

Boletus—the boletes are a group of fleshy fungi that resemble mushrooms, being fleshy and possessing caps and stems. They differ because the lower surfaces of their caps bear pores (openings of tubes) rather than gills like mushrooms. Most of the boletes are edible and are considered very tasty. However, a few are dangerous and may cause illness. Any species in which the pores are colored bright red is very likely to be poisonous. In addition, to be perfectly safe, avoid eating if the cap flesh turns blue after wounding.

Boletus bicolor—the Two-colored Boletus. (Edible.) Figure 24. June 14 to September 6. Cap 2 to 6 inches across, convex, dry, firm, becomes softer and deep rosy-red or becomes paler and spotted or stained with yellow; flesh of cap thick, pale or distinctly yellow, deep golden yellow after exposure; stem 1 to

4 inches long, $\frac{1}{4}$ to $\frac{1}{2}$ inch thick (rarely 1 inch), solid, typically yellow at top and red at base, stem flesh turns blue where wounded; tubes bright yellow or reddish-yellow, slowly change to blue where wounded. Occurs singly and in small groups in woods and on lawns in shady places.

Boletus edulis—the Edible Boletus or Cepe. (Edible.) Figure 25. June 1 to August 4. Cap 4 to 7 inches across, convex to expanded, smooth, grayish-red to brownish-red, usually paler on the lobed or slightly over-lapping margin; flesh of cap thick, white or yellowish and unchanging, reddish beneath the cuticle; stem 2 to 6 inches long and $\frac{1}{4}$ to $1\frac{1}{2}$ inches thick, sometimes slightly thickened at the base, otherwise equally thick; flesh of stem solid, white, yellowish, or brownish, with a raised network of lines; tubes at first stuffed, white, then yellow, and finally greenish. Usually occurs singly or in small groups in woods.

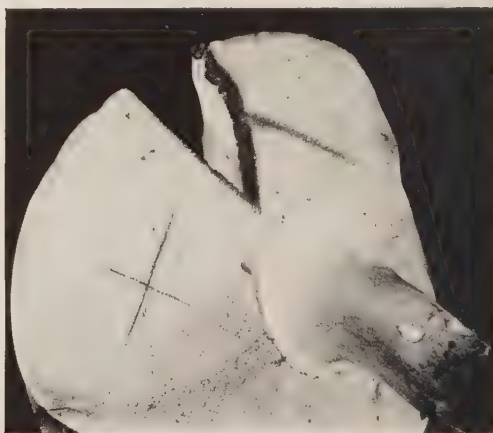


Fig. 24.—*Boletus bicolor*—the Two-colored Boletus (Edible).

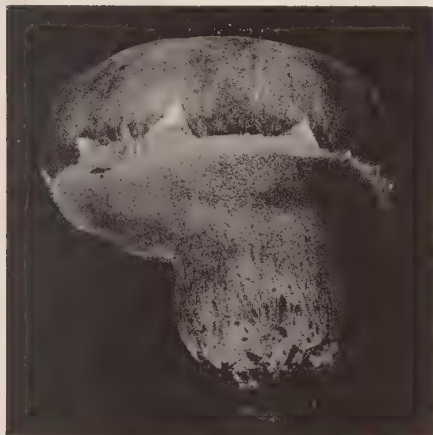


Fig. 25.—*Boletus edulis*—the Edible Boletus or Cepe (Edible).



Boletus scaber—the Rough-stemmed Boletus. (Edible.) Figure 26. May 24 to September 19. Cap $1\frac{1}{2}$ to 5 inches across, convex to flat, usually smooth but often pitted, roughened or wrinkled; cap color variable from straw to yellowish-brown or dark brown, especially where bruised; tubes whitish when young, then tan and darker brown, sometimes blackish where bruised; stem 2 to 6 inches long, tapering upward, $\frac{1}{2}$ to 1 inch thick, solid, roughened with small brown or black dots or ridges, appearing as though scorched or held in sooty smoke. Occurs on ground in woods, swamps, and open places.

Fig. 26.—*Boletus scaber*—the Rough-stemmed Boletus (Edible).





Fig. 27.—*Boletinus pictus*—the Painted Boletinus (Edible).

Boletinus pictus—the Painted Boletinus. (Edible.) Figure 27. June 16 to October 7. Cap 1 to 5 inches across, convex or nearly flat, dark red when fresh, hairy and spotted with red scales separated from each other by yellow cracks; cap flesh yellowish, mottled red; stem $1\frac{1}{2}$ to 3 inches long and $\frac{1}{4}$ to $\frac{3}{4}$ inch thick, slightly swollen at base, solid; a whitish veil or membrane covers the pore surface of young caps, and often remnants of the ruptured veil remain attached to the edge or margin of the cap. Occurs singly and in groups in woods and mossy swamps.

to the margin of mature caps; stem 3 to 5 inches long, and $\frac{1}{4}$ to $\frac{1}{2}$ inch thick, solid, hairy. Usually occurs singly or a few in a scattered group, in woods and along roads.

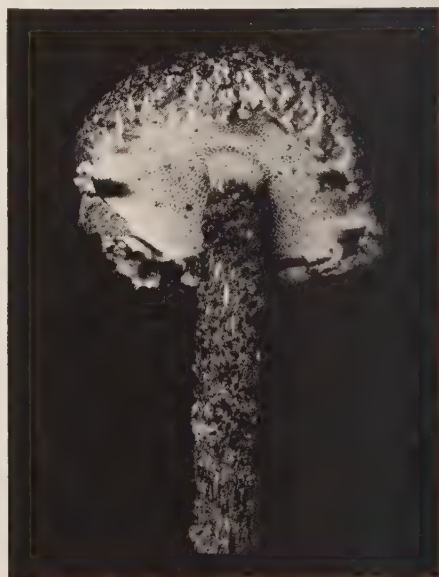


Fig. 28.—*Strobilomyces strobilaceus*—the Cone Boletus (Edible).

Strobilomyces strobilaceus—the Cone Boletus. (Edible.) Figure 28. July 7 to September 12. Cap 3 to 6 inches across, convex then flat, fleshy, firm, dry, shaggy because of numerous coarse black scales and warts, color between scales pale to grayish-white, flesh white, changing to red then black where wounded; a veil or membrane covers the pores when young and remnants may be seen attached

Fistulina hepatica—the Beefsteak Mushroom. (Edible.) Figure 29. July 1 to October 4. Cap 2 to 8 inches across, $\frac{1}{2}$ to 1 inch thick, slightly convex to flat, tongue-shaped, blood-red, soft, and slightly sticky when young; flesh white, streaked with red, soft, juicy; stem absent, or if present, short and attached to the side of the cap, $\frac{3}{4}$ to 4 inches long if present. Occurs singly or a few in clusters, on stumps and logs or trees, especially oak and chestnut.

Polyporus frondosus—the Hen of the Woods. (Edible.) Figure 30. September 20 to October 25. The fruiting body is a more or less globose mass of many rough, lobed caps, fleshy to fleshy-tough; cap fan- or spoon-shaped, 1 to 3 inches across, grayish, drab, or pale "mouse-gray"; pore surface pure white to yellowish, pores angular, small; stem compound, branched, short and thick. Occurs singly at base of stumps or trunks of

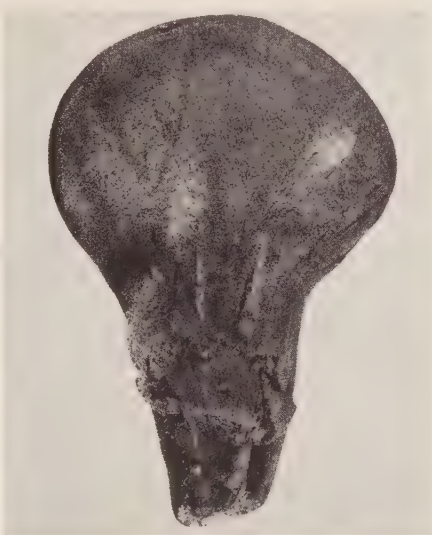


Fig. 29.—*Fistulina hepatica*—the Beefsteak Mushroom (Edible).

living oak, elm, and tupelo trees. Deteriorates rather rapidly but has excellent flavor when young.



Fig. 30.—*Polyporus frondosus*—the Hen of the Woods (Edible).



Fig. 31.—*Polyporus sulphureus*—the Sulphur Polypore (Edible).

Polyporus sulphureus — the Sulphur Polypore. (Edible.) Figure 31. July 20 to October 1. A very large conspicuous fungus, 8 to 24 inches broad, fleshy and watery to rather firm when fresh, drying rigid and brittle; clusters of the shelf-like caps may overlap each other, or caps may be clustered together like a bouquet of flowers; upper surface salmon, sulphur-yellow or bright orange, weathering to chalk-white in age; margin smooth, at first thick and blunt, later thinner; inner tissue white, light yellow or pale salmon, $\frac{1}{4}$ to $\frac{3}{4}$ inch thick; pores very small, tubes $\frac{1}{2}$ to $\frac{1}{4}$ inch long, pore surface bright sulphur yellow. Grows on stumps, trunks, and logs of both deciduous and conifer trees, especially on oak. Its color, shape, and substratum make it impossible to confuse this fungus with any other. One should note where it is collected for it probably will appear there each year thereafter.



FLESHY-TOOTHED FUNGI

Hydnum coralloides (*Hericum coralloides*)—the Coral Hydnum. (Edible.) Figure 32. August 1 to November 3. Fruiting body tufted, roundish, pure white becoming yellowish with age, 2 to 7 inches across; composed of many branches which appear lace-like because of numerous small teeth that hang downward, teeth less than $\frac{1}{4}$ inch long. Occurs singly on beech and oak trees.



Fig. 32.—*Hydnum coralloides* (*Hericum coralloides*)—the Coral Hydnum (Edible).

Hydnum erinaceus (*Heridium erinaceum*)—the Hedgehog Mushroom. (Edible.) Figure 33. July 9 to December 6. Fleshy, white to creamy-white, forming a roundish or pendulous tuft 2 to 10 inches across, narrowed behind to a fairly small point of attachment; teeth hang downward, crowded, slender, tapering, sharp at point, $\frac{3}{4}$ to 2 inches long. Occurs singly from wounds or crotches of beech, locust, oak, etc., occasionally on dead trees. This species becomes tough with age and should be eaten only when young; however, its shape, presence of sharp teeth or spines, and habitat make it easily recognized.

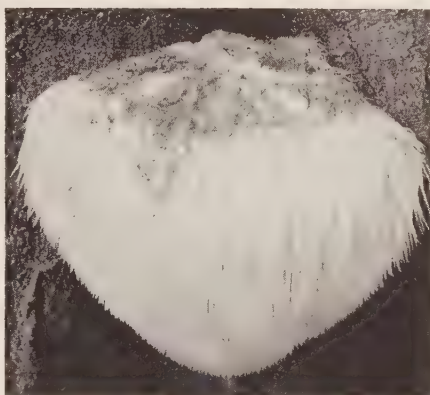


Fig. 33.—*Hydnum erinaceus* (*Heridium erinaceum*)—the Hedgehog Mushroom (Edible).

Hydnum repandum—the Spreading Hydnum. (Edible.) Figure 34. August 1 to September 10. Resembles a mushroom in having cap and stem, but lower surface of cap is covered with white to cream-colored teeth, which are straight, smooth, rounded, pointed at tips; cap pale-yellow to pale-red and sometimes

brown, convex but irregular, smooth, fragile; margin wavy, 1 to 5 inches across; stem stout, white, solid, 1 to 3 inches long and $\frac{1}{2}$ to $\frac{3}{4}$ inch thick. Occurs singly or as a few individuals in a cluster in woods and open places, on soil or among grass or leaves.

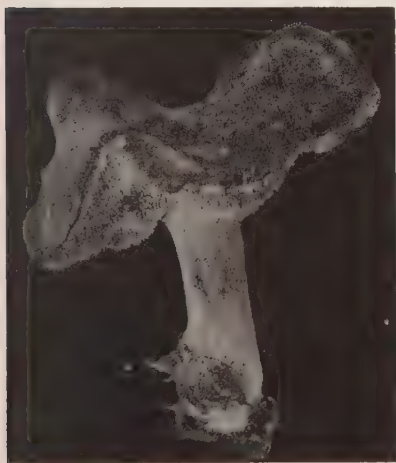


Fig. 34.—*Hydnum repandum*—the Spreading Hydnum (Edible).

FLESHY CORAL FUNGI

Clavaria—the Coral Fungi. A few of the larger species of this group of beautiful fungi may cause illness if eaten; all are distinctive because of their branching. Some are bitter to the taste, have a disagreeable odor, or are tough, but many have an excellent flavor. Some grow on the ground in the woods, others grow from wood. Their characteristic branching makes them easily distinguished from all other fungi. Because of their brittleness they are often used in soups or gravies.

Clavaria botrytis—the Large Coral Fungus. (Edible.) July to October. Figure 35. Branches pallid at base, with wine-red or pink tips at the branch ends; specimens large, up to 12 inches diameter.

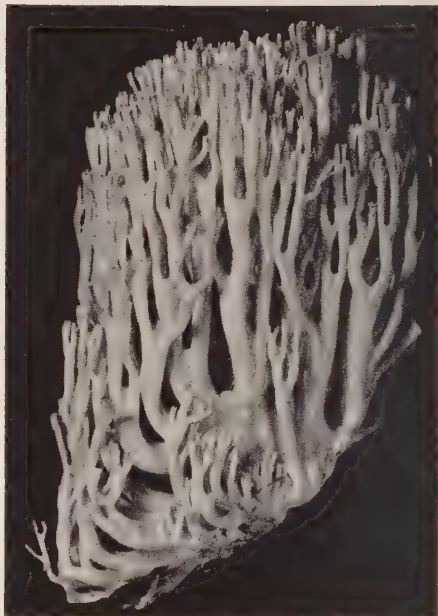


Fig. 35.—*Clavaria botrytis*—the Large Coral Fungus (Edible).

FLESHY CLUB or FUNNEL FUNGI

Craterellus cornucopoides—the Horn of Plenty. (Edible.) Figure 36. June 14 to September 25. Cap dark-gray to blackish-brown, thin, flexible, hollow to base, shaped like a trumpet, about 1 to 3 inches across flaring top, 2 to 4 inches long; stem very short, same color as cap; lower or outside surface of cap smooth to slightly wrinkled. Occurs as fairly large numbers of individuals in scattered clumps, sometimes in tufts, in woods, along woods' roads and paths, and on shaded banks. Highly prized for its excellent flavor.



Fig. 36.—*Craterellus cornucopoides* — the Horn of Plenty (Edible).



Fig. 37.—*Craterellus cantharellus*—the Chanterelle *Craterellus* (Edible).

Craterellus cantharellus—the Chanterelle *Craterellus*. (Edible.) Figure 37. July 1 to September 15. Cap yellow to yellow-orange, firm, fleshy, convex at first, often becoming slightly funnel-shaped, smooth, 1 to 4 inches broad, margin quite often rolled inward; stem thicker at top than at base, solid, smooth, yellow, 1 to 3 inches long and $\frac{1}{4}$ to $\frac{1}{2}$ inch thick. Usually occurs in scattered groups of many individuals in open woods. Resembles the True Chanterelle, but lacks gills on the lower surface of cap.

FLESHY SPONGE and SADDLE FUNGI

Morchella species—the Sponge Mushrooms or Morels. (Edible.) Figure 38. April 25 to May 20. The six species of *Morchella* known in Pennsylvania are so similar that they will be described only in a general way. All are edible. Height variable, 2 to 5 inches; cap bell-shaped, conic, or hemispherical, marked with very prominent ridges and furrows or with prominent ridges connected by cross ridges; cap looks like a sponge; caps vary in color from white, to gray, to



Fig. 38.—*Morchella* species—the Sponge Mushrooms or Morels (Edible).

a light tan. Stems distinct, thick, fleshy, and white. Cap and stem both hollow. Usually occurs in woods on the ground. Distribution is erratic; sometimes morels grow under oak and hickory trees in open woods; at other times they may be far removed from trees. They have been found with consistent regularity in uncultivated grassy apple orchards. The older the orchard the more likely that morels will be found there. At times they grow in profusion in rich soil along creek banks where overflows are common. Old fence rows often yield them in abundance. The time of their appearance is short. One should look for them especially at the time that the first petals begin to fall from apple blossoms. A wet season is best for their development. They often are produced year after year in the same place. In preparation for cooking, soak morels overnight in salt water to remove insects and insect larvae.

Helvella infula (*Gryomitra*) — the False Morel. (Poisonous.) Figure 39. May 2 to October 10. Cap 2 to 3 inches broad, irregularly spherical, lobed, some-



Fig. 39—*Helvella infula* (*Gryomitra*)—the False Morel (Poisonous).

times saddle-shaped, bay-red to brownish; stem whitish, 2 to 3 inches long, thick, stuffed or hollow. Single, rarely 2 or 3 occur together, commonly found in wet places, or around springs, sandy soils and also pine woods.

PUFFBALLS

The fungi called puffballs are almost all edible if eaten when young, that is, if eaten when the interior is pure white. However, collectors should cut through the middle of the smaller ones to make sure that they are not immature stages of stinkhorns (bad odor) or *Amanitas* (poisonous). Visual examination of the cut section will show a gelatinous inner layer if the specimen is the early stage of a stinkhorn, and the cap and stem of an *Amanita* if it is not a puffball. These

should *not be eaten*. Puffballs are so called because they are shaped like a ball, and at maturity, the powdery spores may be made to puff out in a dusty cloud when the puffball is squeezed. They grow on the ground and on the wood of fallen trees or stumps.

Calvatia craniformis — the Skull-shaped Puffball. (Edible.) Figure 40. August 1 to November 1. Globose, 3 to 6 inches across, whitish or pinkish-brown, smooth, soon cracking into irregular

areas, with a short, stem-like base. Usually occurs in groups of many individuals in open grassy meadows and open woods. This species has a fine flavor, but should be peeled and eaten only when young.

Calvatia gigantea—the Giant Puffball. (Edible.) Figure 41. August 15 to September 15. Globose or egg-shaped, 8 to 24 inches across; practically no stem, attached to the ground by cord-like strands; outer surface smooth although sometimes slightly roughened, like chamois to touch, white or whitish, later becoming yellow or brown; inner substance pure white at first, changing to yellowish, and finally dingy olive with spores. Occurs singly or in groups of a few, on lawns, pastures, meadows and in open woods. This fungus is so large and of such unique structure that it can not be mistaken for any other. It is highly sought as food.

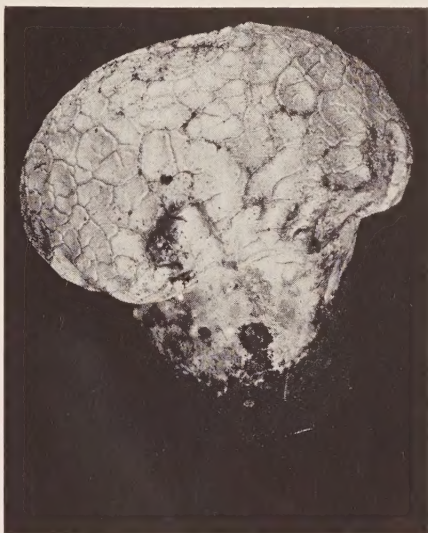


Fig. 40.—*Calvatia craniformis*—the Skull-shaped Puffball (Edible).

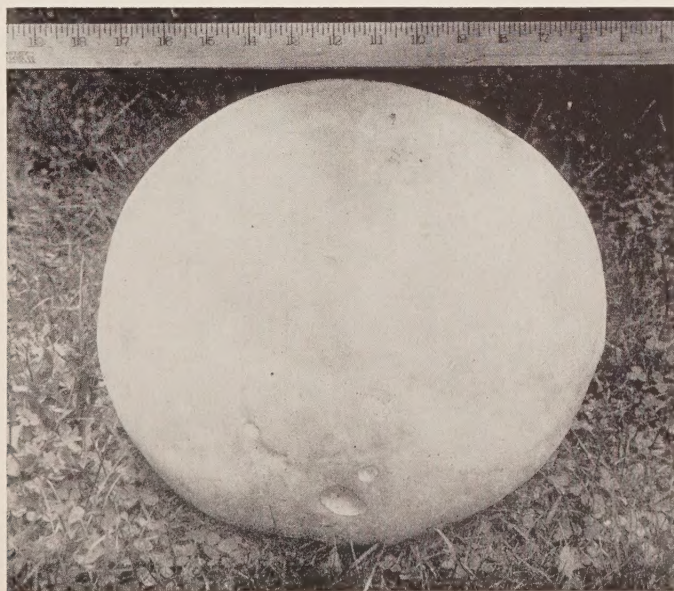


Fig. 41.—*Calvatia gigantea*—the Giant Puffball (Edible).

REFERENCES

Many readers of this bulletin will wish to become acquainted with fungi not discussed herein. Numerous scientific and popular books describe and illustrate other fungi. Some of them are:

Mushrooms in their Natural Habitats by A. H. Smith. 2 volumes. Sawyer's Inc., Portland, Oregon.

Keys to the Common Fleшы Fungi by C. M. Christensen. Burgess Publishing Co., Minneapolis, Minnesota.

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Some Common Mushrooms and How to Know Them by Vera K. Charles. United States Department of Agriculture Circular 143. U. S. Government Printing Office, Washington, D. C.

The Mushroom Hunter's Field Guide by A. H. Smith. University of Michigan Press, Ann Arbor, Michigan.

The Boletaceae of North Carolina by W. C. Coker and A. H. Beers. University of North Carolina Press. Chapel Hill, North Carolina.

Puffballs and Their Allies in Michigan by A. H. Smith. University of Michigan Press, Ann Arbor, Michigan.

A Popular Guide to the Higher Fungi (Mushrooms) of New York State by L. C. C. Krieger, The University of the State of New York, Albany, N. Y.

